

**WHAT IS CLAIMED IS:**

1. An air-liquid separating apparatus for compressed air,  
comprising:

a cooling device adapted to be connected to an air source via

5 a first transfer tube, the cooling device including:

a liquid cooling tank filled with cooling agent;

a cooling tube spiraled in the liquid cooling tank for  
condensing and separating the mist in the compressed air, the  
cooling tank having a first end and a second end respectively  
10 extending through the liquid cooling tank, the first end of the  
cooling tube connected to the first transfer tube; and

a second transfer tube having a first end connected the  
second end of the cooling tube and a second end opposite to the  
first end of the second transfer tube; and

15 an air-liquid separating tank connected to the liquid cooling  
tank, the second end of the second transfer tube extending into the  
air-liquid separating tank toward a bottom of the air-liquid separating  
tank, wherein the compressed air is cooled and released again in the  
air-liquid separating tank, the air-liquid separating tank including:

20 a water drain connected to the bottom of the air-liquid  
separating tank for draining the condensed water;

an air outlet defined in a top portion of the air-liquid  
separating tank for exhausting the compressed air; and

a backflow tube having a first end connected to the air outlet and a second end for outputting the compressed air, the backflow tube provided to carry the heat from the cooling device.

2. The air-liquid separating apparatus as claimed in claim 1,  
5 wherein the backflow tube is partially received in the liquid cooling tank and bent within the cooling tube.

3. The air-liquid separating apparatus as claimed in claim 1 further comprising an air-cooling tank disposed between the liquid cooling tank and the air compressor, the air-cooling tank including:  
10 an inner tank longitudinally mounted in the air-cooling tank, the inner tank has a first end and a second respectively extending through a bottom and a top of the air-cooling tank, wherein the first transfer tube has a first end connected to the second end of the inner tank and a second end connected to the first end of the cooling tube,  
15 and the second end of the backflow tube is connected to the air-cooling tank for providing a cooled compressed air into the air-cooling tank to dissipate the heat from the inner tank;

a transfer tube having a first end adapted to be connected to an air compressor and a second end connected to the first end of the  
20 inner tank for allowing the compressed air pass into the inner tank;

multiple fins radially extending from an outer periphery of the inner tank for dissipating the heat from the inner tank; and

an output tube having a first end extending into the

air-cooling tank for exhausting the compressed air and a second end adapted to be connected to pneumatic tools.

4. The air-liquid separating apparatus as claimed in claim 1, wherein the cooling tube has a diameter greater than that of the first  
5 transfer tube such that a pressure value of the compressed air is suddenly reduced.

5. The air-liquid separating apparatus as claimed in claim 1, wherein the air-liquid separating tank comprises a water collector received therein and longitudinally connected to the second end of the  
10 second transfer tube for cooling down and condensing the compressed air.

6. The air-liquid separating apparatus as claimed in claim 3, wherein the cooling tube has a diameter greater than that of the first transfer tube such that a pressure value of the compressed air is  
15 suddenly reduced.

7. The air-liquid separating apparatus as claimed in claim 3, wherein the air-liquid separating tank comprises a water collector received therein and longitudinally connected to the second end of the second transfer tube for cooling down and condensing the compressed  
20 air.

8. The air-liquid separating apparatus as claimed in claim 5, wherein the water collector is a cylindrical structure and comprises:  
a body connected to the second end of the second transfer

tube;

a top plate and bottom plate respectively secured on an upper portion and a lower portion for closing the body;

a bank of steel wire velvet received in the body and secured  
5 on the bottom plate, the bank of steel wire velvet provided to adhere the mist of the compressed air that longitudinally passes relative to the water collector;

multiple through holes defined in the body for the compressed air passing the body;

10 multiple partitions radially extending from an outer periphery of the body; and

a net mounted around the body and abutting a distal edge of each of the multiple partitions, the net having multiple fine eyes for intercepting the mist of the compressed air that laterally passes relative  
15 to the water collector.

9. The air-liquid separating apparatus as claimed in claim 7, wherein the water collector is a cylindrical structure and comprises:

a body connected to the second end of the second transfer tube;

20 a top plate and bottom plate respectively secured on an upper portion and a lower portion for closing the body;

a bank of steel wire velvet received in the body and secured on the bottom plate, the bank of steel wire velvet provided to adhere

the mist of the compressed air that longitudinally passes relative to the water collector;

multiple through holes defined in the body for the compressed air passing the body;

5 multiple partitions radially extending from an outer periphery of the body; and

a net mounted around the body and abutting a distal edge of each of the multiple partitions, the net having multiple fine eyes for intercepting the mist of the compressed air that laterally passes relative

10 to the water collector.